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10/527,993	10/17/2005	Satish Gunturi	004501-807	4890
21839 7590 09/14/2007 BUCHANAN, INGERSOLL & ROONEY PC POST OFFICE BOX 1404 ALEXANDRIA, VA 22313-1404			EXAMINER DICKEY, THOMAS L	
			ART UNIT 2826	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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TH

Office Action Summary	Application No. 10/527,993	Applicant(s) GUNTURI ET AL.	
	Examiner Thomas L. Dickey	Art Unit 2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 April 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Art Unit: 2826

DETAILED ACTION

1. The amendment filed on 04/02/2007 has been entered.
2. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Ikuhashi 2001/0017377 discloses exactly the same structure as Lang et al. 6,426,561, but (perhaps because Applicants themselves did not write the disclosure of Ikuhashi 2001/0017377, as they did that of Lang et al. 6,426,561) the terminology used in Ikuhashi does not provide a "smoking gun" that certain claimed elements are part of the prior art. Note that the disclosure of Lang et al. 6,426,561 was published (overseas) prior to that of Ikuhashi 2001/0017377. Given that a) Lang et al.'s overseas disclosures are not written in English; and b) Lang et al. 6,426,561 published more than a year prior to the PCT filing (effective US filing date) of the instant application, the Examiner has chosen to cite 6,426,561 in preference to a virtual plethora of publications, by Ikuhashi and Lang et al., written in various languages and published on various dates, all more than one year prior to Applicants' effective US filing date.

Art Unit: 2826

Response to Arguments

3. Applicant's arguments, see page 6 of the arguments filed 04/02/2007, with respect to the rejection(s) of claim(s) 1-4, 8, and 9 under 35 USC 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Lang et al., Tsuruoka, and Kogo et al.

Information Disclosure Statement

4. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the examiner has cited the references Applicants have incorporated into the specification on a form PTO-892, they have not been considered. Applicant may rely on the attached form PTO-892 for assurance that Lang et al. 6,426,561 has been considered.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

Art Unit: 2826

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-9 are rejected under 35 USC 112, first paragraph, for lack of enablement.

The enablement clause of section 112 requires that the specification teach those in the art to make and use the invention without undue experimentation. Factors to be considered in determining whether a disclosure would require undue experimentation include (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented in the specification, (3) the presence or absence of working examples in the specification, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims. *In re Wands*, USPQ2d 1400,1404 (CA FC) 1988, citing with approval *Ex parte Forman*, 230 USPQ 546, 547 (BdPatApp&Int) 1986. See MPEP §§ 2163.01, 706.03.

In the instant case, (1) the quantity of experimentation necessary is judged to be high, based on the fact that claim 1 requires the base plate and top plate to be attachable at a plane interface to an electrode of a semiconductor chip, and a random distribution is known (see col. 4, line 31-39, col. 10, line 10-19 of US 4,196,442) to lead to bulging or swelling of the composition that would make such a planar interface impossible;

Art Unit: 2826

Further, (2) The amount of direction or guidance presented by Applicants is virtually non-existent (at page 2 paragraph 3 Applicant's specification informs the reader that, according to US 4,196,442 it is impossible to make an operable embodiment of the claimed invention. A little later, at page 3 paragraph 1, Applicants state in conclusory fashion that "According to the invention, the high-power press pack semiconductor module comprises a layer, which is brought into direct contact with one or both of the main electrodes of the Si semiconductor chip, said layer being made of a MMC (metal matrix composite) material utilising [sic] two-dimensional, [sic] in the plane of the contact interface randomly oriented short graphite fibers whose CTE can be tailored to a value either close to or matching that of Si." These are the only mentions Applicants make of a plate made from MMC with randomly distributed graphite fibers in the plane of its interface with an electrode of a semiconductor chip); and (3) there are no working examples in the specification of an MMC top or bottom plate having two-dimensional randomly oriented short graphite fibers in the plane of its contact interface with an electrode.

Regarding Wands factor 4, the "Nature of the Invention": The Federal Circuit has virtually never referred explicitly to the "Nature of the Invention" as a *Wands* factor, presumably because it is too ambiguous. See Jeffrey L. Light, *Note*, 3 Chi.-Kent J. Intell. Prop. 87. In one of the few instances in which it was explicitly mentioned, *Plant Genetic*

Art Unit: 2826

Systems, N.V. v. Dekalb Genetics Corp., 315 F.3d 1335, 1339 (Fed. Cir. 2003), the court found the consideration of this issue to be moot. Plant Genetic Systems had argued that the pioneering nature of the invention must be considered in determining the scope of enablement and that the district court erred by not taking it into account. *Id.* The Federal Circuit rejected this argument, holding that the district court did not need to make such a finding. *Id.* Because of the lack of precedents discussing this factor it is unclear how this factor should be considered in evaluating the enabling nature of Applicants' disclosure. See *Chi.-Kent J. Intell. Prop.* at 88.

Regarding (5) the state of the prior art: It is undisputed that the prior art unambiguously teaches that the claimed invention would be inoperative given the knowledge available to one of skill in the art on Applicants' effective filing date of 9/29/03. Finally, (6) the relative skill of those in the art is high, roughly B.S.E.E. or higher, (7) the art is unpredictable, in that there is no way of knowing the physical properties of a given metal matrix composite material (out of literally thousands of such composites imaginable) until one has made and tested it; and (8) the claims are narrow, in that only a metal matrix composite material whose short cut graphite fibers are randomly distributed in the plane of a particular interface will meet the claim.

In light of these factors, these claims are considered to be not enabled by this disclosure.

Art Unit: 2826

It is noted that both Lang et al. 6,426,561 and Tsuruoka 4,403,242 disclose the use of press pack means (described in Tsuruoka, for example, as "screwing nuts 15 and 16 threaded to the bolts 13 and 14, a pressing force is applied to the interfaces of the auxiliary pressure plate 8-receptacle 7-ball 5-receptacle 6-insulator 3-cooling body 1-semiconductor device 100-cooling body 2-insulator 4-pressure plate 9." Note column 3 lines 8-13 of Tsuruoka) that the unsophisticated reader would assume capable of overcoming small irregularities (such as bulges) in the surface of the top and bottom plates. However, Applicants (who are, after all, experts in this field) insist that this is not so, and that use of a metal matrix composite material whose short cut graphite fibers are randomly distributed in the plane of a particular interface will produce bulges of a sort that renders the claimed device inoperable. See page 7 of the remarks filed 4/2/07.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

Claim 6 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 6 recites that the matrix comprises Ag, Al, Au or Cu. This is broader in scope than claim 1 (requiring that the matrix comprise only either Al or Ag), from which claim 6

Art Unit: 2826

depends. Claim 6 incorporates by reference all the limitations of claim 1 (see 35 U.S.C. 112, fourth paragraph). It cannot be determined whether Au or Cu are alternatives to Ag or Al, as recited in claim 6, or whether the matrix necessarily includes only either Ag or Al, as recited in claim 1.

Correction is required.

Priority

7. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been received from the International Bureau.

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

A. Claims 1-3, 8, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over LANG ET AL. (6,426,561) in view of TSURUOKA (4,403,242) and KOGO ET AL. (5,437,921, as cited by Applicants on 10/17/2005).

Lang et al. discloses a high-power press pack semiconductor module comprising electrically conducting base and top plates (not shown in the figures. At column 2 lines

Art Unit: 2826

50-59 Lang et al. describe their electrically conducting base and top plates as "Further foils or wafers... not shown in FIG. 1 [with] thermal expansion [matched to] silicon [and] provided between the first main electrode 5 and the substrate 2 on the one hand, and between the second main electrode 6 and the contact piston 3, [and] produced, for example, from materials such as Mo, Cu, or Mo--Cu composites") at least one semiconductor chip 4 including silicon, a semiconductor material, a first main electrode 5 that makes contact with the base plate forming a plane interface and a second main electrode 6 that makes contact with the top plate, a housing 1 containing the base plate, top plate, and semiconductor chip 4, wherein a material 7 is provided adjacent at least one of said first 5 or second 6 main electrodes that, together with the semiconductor material forms an eutectic alloy or an alloy whose melting point is below that of the semiconductor material, and wherein at least one of said base plate and top plate is made of a material (molybdenum) whose coefficient of thermal expansion is close to that of the semiconductor material (silicon). Note figure 1, column 2 lines 34-59, and column 3 lines 9-43 of Lang et al. Lang et al. does not disclose that said both said base plate and top plate are made of the same metal matrix composite material, said metal matrix composite material comprised of two-dimensional randomly distributed short cut graphite fibers in the plane of the interface in an Al or Ag matrix and said metal matrix composite material has a metal content of at least 25 percent by volume.

Art Unit: 2826

However, Tsuruoka discloses a high-power press pack semiconductor module, said high-power press pack semiconductor module comprising a housing 1-2-3-4 containing a base plate 106, top plate 111, and semiconductor chip 101, the base plate 106 and the top plate 111 both made of the same metal matrix composite material, said metal matrix composite material comprised of short cut graphite fibers in the plane of the interface in a Cu matrix. Note figures 1-3, column 4 lines 21-66, and column 6 lines 30-36 of Tsuruoka. Note (column 4 lines 61-63 and column 6 line 31) that, just like the molybdenum top and base plates of Lang et al., Tsuruoka's top 111 and base 106 plates have CTEs that closely match that of the silicon chip 101.

When the substitution of one known element for another would have yielded results that were predictable to of ordinary skill in the art, the result of that substitution would have been obvious, within the meaning given that term by the statute. It has been held, for example, that the substitution of a continuous, two-ply seam for a folded seam, both being known to the art in question, is no more than the simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for improvement, and therefore obvious. See *Ex parte Smith*, 83 USPQ2d 1509, 1518 (Bd. Pat. App. & Int. 2007, PRECEDENTIAL). See also *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1740, 82 USPQ2d 1385, 1396 (2007) ("In *United States v. Adams*, ... [t]he Court recognized that when a patent claims a structure already known

Art Unit: 2826

in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result.”)

Tsuruoka teaches enough so that one of skill in the art would have expected to be able to successfully substitute the base top plates 106, 111, both made of the same metal matrix composite material, said metal matrix composite material comprised of short cut graphite fibers in the plane of the interface in a Cu matrix, for Lang et al.'s molybdenum base and top plates, with a predictable result. It would therefore have been obvious to a person having skill in the art to modify Lang et al.'s semiconductor module by including the housing containing a base plate and top plate both made of the same metal matrix composite material, said metal matrix composite material comprised of short cut graphite fibers in the plane of the interface in a Cu matrix, as taught by Tsuruoka, thus achieving the claimed invention.

The short cut graphite fibers of Tsuruoka's Cu metal matrix composite material are not, however, randomly distributed in the plane of the interface of an Al or Ag matrix having a metal content of at least 25 percent by volume. Therefor the combination of Lang et al. and Tsuruoka does not suggest a semiconductor module having a metal matrix composite material that has these missing properties. However, Kogo et al. discloses an electronic component mounting base material comprising an aluminum alloy reinforced with graphite fibers with a volume fraction of about 15 per cent, the

Art Unit: 2826

graphite fibers in the base material being short cut graphite fibers two-dimensionally randomly distributed in a plane of said Al alloy matrix. Note figure 2 and column 5 lines 26-58 of Kogo et al. Because the result would have been predictable, according to the evidence supplied by Kogo et al., it would have been obvious to a person having skill in the art to modify the semiconductor module suggested by Lang et al. and Tsuruoka by substituting for Tsuruoka's Cu metal matrix composite material the electronic component mounting base material comprising an aluminum alloy reinforced with graphite fibers with a volume fraction ranging of about 15 per cent, the graphite fibers in the base material being short cut graphite fibers two-dimensionally randomly distributed in a plane of said Al alloy matrix, as taught by Kogo et al., thus achieving the claimed invention.

In a case such as this one, where "an improvement is no more than 'the simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for improvement,' *KSR Int'l Co. v. Teleflex Inc.*, [127 S.Ct. 1727, 1740, 82 USPQ2d 1385, 1396 (2007)], no further analysis is required of the Examiner." See *Ex parte Smith*, 83 USPQ2d at 1518.

With specific regard to claims 8 and 9, Lang et al., Tsuruoka, and Kogo et al. suggest the claimed high-power press pack semiconductor module except for assuring that at least one of said base plate or top plate of a metal matrix composite material has

Art Unit: 2826

a thickness of at least the thickness of the semiconductor material, said base plate and top plate therefor necessarily having a combined thickness of said at least the thickness of the semiconductor material. It would have been obvious to one of ordinary skill in the art at the time the invention was made to assure that at least one of said base plate or top plate of a metal matrix composite material has a thickness of at least the thickness of the semiconductor material, said base plate and top plate therefor necessarily having a combined thickness of said at least the thickness of the semiconductor material, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. See *In re Aller*, 105 USPQ 233.

B. Claims 4-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over LANG ET AL. (6,426,561) in view of Tsuruoka (4,403,242) and Kogo et al. (5,437,921), and further in view of Pepper et al. (3,770,488).

Lang et al., Tsuruoka, and Kogo et al. suggest a high-power press pack semiconductor module comprising all the limitations of claims 4-7 except that said metal matrix composite material comprises an Ag or Al metallic matrix alloy with a semiconductor material with a Si content of at most 13 percent, resulting in a semiconductor (Si) content limited to not more than the semiconductor material content of an eutectic composition. Note figure 1, column 2 lines 34-59, and column 3 lines 9-43

Art Unit: 2826

of Lang et al., figures 1-3, column 4 lines 21-66, and column 6 lines 30-36 of Tsuruoka, and figure 2 and column 5 lines 26-58 of Kogo et al.

However, Pepper et al. discloses metal-graphite fiber matrices composite comprising various "real-world" examples of metal matrix composite materials comprises an Ag or Al metallic matrix alloy with a semiconductor material with a Si content of at most 13 percent, resulting in (note that this result is guaranteed by the fact that, because claim 6 depends from claim 5, claim 5 reads on claim 6) content limited to not more than the semiconductor material content of an eutectic composition. Note table I and examples 6-8 and 14-16 of Pepper et al. Note that, according to column 3 lines 35-41 of Pepper et al., "Molten aluminum, magnesium and their base alloys do not readily wet graphite at temperatures up to approximately 800 degrees... At temperatures in excess of 800 degrees [aluminum and magnesium] rapidly react with graphite to form aluminum or magnesium carbide ... lead[ing] to degradation of the mechanical properties of the graphite yarn."

The further limitations of applicant's claim 7 do not distinguish over the Pepper et al. reference regardless of the functions allegedly performed by the claimed device, because only the device per se is relevant, not the recited function of tailoring the semiconductor material content and thickness of the semiconductor material such that the hotspot alloy is in the eutectic range without bulk precipitation.

Art Unit: 2826

Note that functional language in a device claim is directed to the device per se, no matter which of the device's functions or properties is referred to in the claim. *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990) ("[A]pparatus claims cover what a device *is*, not what a device *does*" [emphasis in original]), makes it clear that it is the patentability of the device per se which must be determined in a "functional language" claim and not the patentability of the function, and that an old or obvious device alleged to perform a new function is not patentable as a device, whether claimed in "functional language" terms or not. Note that caselaw makes clear that in such cases applicant has the burden of showing that a prior art device that appears reasonably capable of performing the allegedly novel function is in fact incapable of doing so. See *In re King*, 231 USPQ 136 (Fed. Cir, 1986) ("It did not suffice merely to assert that [the cited prior art] does not inherently achieve [the claimed function], challenging the PTO to prove the contrary by experiment or otherwise. The PTO is not equipped to perform such tasks") and *In re Best*, 562 F.2d 1252, 1254, 195 USPQ 430, 433 (CCPA 1977) (claiming a new use, new function or unknown property which is inherently present in the prior art does not necessarily make the claim patentable). See MPEP § 2114.

In *Ex parte Smith*, 83 USPQ2d at 1514, the Board found, "There is nothing in the Specification to indicate that the [property] necessary to render the [claimed structure]

Art Unit: 2826

[capable of the claimed function] is anything more than the inherent result of constructing the [claimed structure] of standard materials in accordance with claim 35's other limitations, which are expressly disclosed in [the prior art]." The Board held, "We thus agree with the Examiner that a prima facie case of anticipation is established by [the prior art]. Because the Appellant presented no evidence to overcome the Examiner's finding of the inherent ability of [the prior art's] [structure] to [perform the claimed function], she failed to meet her burden to overcome that prima facie case. We therefore find that claim 35 is anticipated by [the prior art]." The Board cited *In re King* for the proposition that "[A] prima facie case of anticipation [may be] based on inherency," and *In re Best* for the proposition that "Where, as here, the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product," in support of its holding. *Id.*

In this case it is reasonable to assume that Pepper et al.'s metal matrix composite material is capable of tailoring the semiconductor material content and thickness of the semiconductor material such that the hotspot alloy is in the eutectic range without bulk precipitation, because a comparison of Applicant's specification to Pepper et al.'s disclosure reveals that Pepper et al. discloses a metal matrix composite material that is

Art Unit: 2826

apparently identical to the metal matrix composite material Applicant describes as being capable of having the function or property characterized as "tailoring the semiconductor material content and thickness of the semiconductor material such that the hotspot alloy is in the eutectic range without bulk precipitation."

Because, with regard to claim 7, it is reasonable to assume that assume that Pepper et al.'s metal matrix composite material is capable of performing the claimed function or achieving the claimed property, the burden shifts to Applicants to show that it cannot. See MPEP § 2114. See also *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985) (Claims were directed to a titanium alloy containing 0.2-0.4% Mo and 0.6-0.9% Ni having corrosion resistance. A Russian article disclosed a titanium alloy containing 0.25% Mo and 0.75% Ni but was silent as to corrosion resistance. The Federal Circuit held that the claim was anticipated because the percentages of Mo and Ni were squarely within the claimed ranges. The court went on to say that it was immaterial what properties the alloys had or who discovered the properties because the composition is the same and thus must necessarily exhibit the properties); and *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990) (Applicant argued that the claimed composition was a pressure sensitive adhesive containing a tacky polymer while the product of the reference was hard and abrasion resistant. According to the Federal Circuit, "The Board correctly found that the

Art Unit: 2826

virtual identity of monomers and procedures sufficed to support a *prima facie* case of unpatentability of Spada's polymer...").

With regard to all of claims 4-7, because Pepper clearly teaches a predictable (and clearly advantageous) result from substituting Al-Si (13% silicon) metal matrix composite material for the Al alloy of unknown composition taught by Kogo et al. it would have been obvious to a person having skill in the art to further modify the a high-power press pack semiconductor module suggested by Lang et al., Tsuruoka, and Kogo et al. by employing a metal matrix composite material comprises an Ag or Al metallic matrix alloy with a semiconductor material with a Si content of at most 13 percent, resulting in Si content limited to not more than the semiconductor material content of an eutectic composition, as taught by Pepper et al., thus achieving the claimed invention. See *Ex parte* Smith, 83 USPQ2d at 1518, as discussed above.

In their specification Applicants supply a lengthy description of the manner by which they discovered what they clearly believed to be a groundbreaking new means of forming a metal matrix composite material with a Si content of at most 13 percent (i.e., less than eutectic), including numerous experimental results with over a dozen examples and comparative examples. Applicants clearly performed a great deal of original research to achieve these results. Note page 5, line 15, through page 7 line 3. However, as is often the case when science progresses to the point where an

Art Unit: 2826

improvement suggests itself, Pepper et al. performed exactly the same research, a short time before Applicants did it. Applicants made a highly persuasive case for the allowability of claims 5-7 in their remarks of 9/18/06, and these claims were in fact indicated allowable. However, in view of Pepper et al.'s disclosure, these claims must be rejected.

It should be said that the case for non-obviousness of claims 5-7 also suffers in view of the fact that one could have simply purchased a metal matrix composite material having short cut graphite fibers randomly distributed in a plane of an Al-Si (13% Si) matrix (for example **METGRAF™ 7-200** or **METGRAF™ 4-230** from MMCC Inc., 101 Clematis Avenue, Waltham, MA 02453, or **6092/SiC/17.5p [DRA]** from DWA Aluminum Composites, 21 130 Superior Street, Chatsworth, CA 9 13 1 1-4393, USA) at the time of the invention.

Conclusion

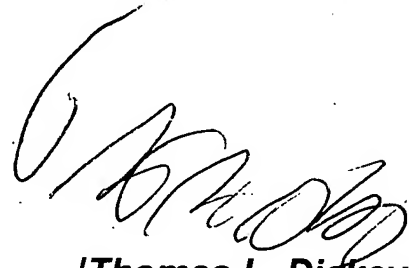
9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas L. Dickey whose telephone number is 571-272-1913. The examiner can normally be reached on Monday-Thursday 8-6.

If attempts to reach the examiner by telephone are unsuccessful, please contact the examiner's supervisor, Sue A. Purvis, at 571-272-1236. The fax phone number for the

Art Unit: 2826

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



**/Thomas L. Dickey/
Primary Examiner
Art Unit 2826**